

UNIVERSITY OF ALBERTA LIBRARY



0 0001 3776 083

Report No. 1

SOUTHEASTERN FOREST SECTION



NOV 21 1979

SCIENCE  
PUBLICATIONS



# Forest Resources Inventory

—1956—



SD  
146  
M3  
M27  
1956  
no.1

SCI

③ FOREST SERVICE

Department of Mines and Natural Resources  
PROVINCE OF MANITOBA



Ex LIBRIS  
UNIVERSITATIS  
ALBERTAENSIS



619.gcf  
M278

# *Forest Resources Inventory* *1956*

**Report No. 1**  
**SOUTHEASTERN FOREST SECTION**



**FOREST SERVICE**  
**Department of Mines and Natural Resources**  
**PROVINCE OF MANITOBA**

## **PREPARED BY FOREST MANAGEMENT DIVISION**

C. B. Gill, Chief of Division

Field Inventory by W. G. Edmonds, A. J. Kotowycz, A. O. Jardine, and C. K. Smith.

Aerial photo interpretation and forest maps by W. G. Edmonds, A. J. Kotowycz, A. O. Jardine, C. E. Leitkie, C. K. Smith, and M. Bailey.

Tree volume and stand volume tables prepared by A. O. Jardine, C. E. Leitkie, M. E. Benum, and L. Pasterz.

Compilation done by A. J. Kotowycz, M. E. Benum, and L. Pasterz.

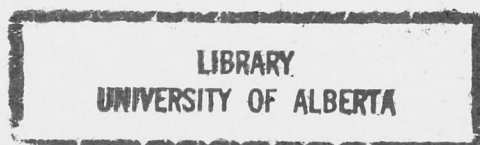
Supervision of compilation and final estimate by M. E. Benum.

Maps Nos. 1 to 3 by P. Peloquin.

Tables Nos. 1 to 18 by C. B. Gill.

Figures Nos. 1 to 10 by L. Pasterz.

Photo credits—Keewatin Lumber Company, C. B. Gill, R. A. Haig, and V. H. Phelps.





# Preface

This is one of a series of bulletins summarizing the results of the ground and aerial survey work which was completed in 1956 in connection with the latest Forest Inventory of Manitoba. The figures in this new series will replace those previously used based on surveys made between 1927 and 1930, and tabulated in "The Forests of Manitoba, Bulletin 85," published by the Dominion Forest Service in 1934.

For the purpose of the new Forest Inventory the Province has been divided (as shown on Map 1) into four zones based on climate, original vegetation and predicted future use, as follows:

Agricultural Forest	Transition from Forest to Tundra Tundra or Barren Lands
------------------------	--

The Forest Zone may be defined as the area which is producing or is capable of producing forest crops and which for climatic reasons is, in the main, more suitable for the production of wood than for agricultural crops. The Forest Zone has an over-all area (omitting the three major lakes—Winnipeg, Manitoba and Winnipegosis) of about 113,238 square miles or nearly half the total area of Manitoba (less these lakes).

Based on the presence or absence of transportation routes such as railways, highways and water routes, the Forest Zone is again divided into an Accessible and Inaccessible Area.

The Accessible Forest Zone with an over-all area of about 64,122 square miles has been divided for Inventory purposes into seven main Forest Sections based on physical geography and administrative boundaries, as follows:

Southeastern Winnipeg River Lowlands South Mountain	Lowlands North Nelson River Northern Mining
--	---

Each of the Forest Sections is again divided into Working Circles which conform with Forest Ranger Districts, except in the more northerly areas where on account of their large size it has been necessary to subdivide the Ranger Districts. In addition to the seven major Forest Sections listed above, the Accessible Forest includes two minor areas in southern Manitoba—the Spruce Woods and the Turtle Mountain Forest Reserves.

The Inaccessible Forest with an over-all area of about 49,116 square miles has been divided into 20 Inventory Units.

Although a limited amount of the Forest Zone was inventoried before 1951, the main work was done commencing April 1st, 1951, from which date the Federal Government has reimbursed to the Province one-half of the expenditures incurred in forest resources inventory under the terms of an agreement with the Province pursuant to the provisions of the Canada Forestry Act.

A separate report will be published for each of the seven major Forest Sections of the Accessible Area, and an eighth report will cover the Spruce Woods and Turtle Mountain. The whole of the Inaccessible Forest will be covered by an additional report.

An explanation of the method of survey is given in the Appendix.

# Contents

	Page		Page
PREFACE		Fire Protection .....	22
FOREST RESOURCES INVENTORY .....	9	Forest Inventory .....	23
Location and Area .....	9	Utilization and Working Plans .....	24
Geology .....	9	Reforestation .....	29
Topography .....	11	APPENDIX	
Soils .....	12	Survey Methods .....	30
Climate .....	12	Rotation .....	32
Forest Composition .....	13	Allowable Cut .....	32
Settlement and Development .....	14	Common and Botanical Names of Tree Species ..	32
Forest Administration .....	19		

## Tables

TABLE 1—Area Classification .....	9	TABLE 10—Softwood and Hardwood Volume by Size Classes and Working Circles .....	26
TABLE 2—Classification of Productive Forest Land by Cover Types and Tenure .....	9	TABLE 11—Softwood and Hardwood Volume by Land Tenure and Working Circles .....	27
TABLE 3—Area Classification of Productive Forest by Age Classes, Cover Types and Merchant- ability .....	14	TABLE 12—Softwood and Hardwood Volume per Acre—Merchantable Area—by Land Tenure, Cover Type and Working Circles .....	27
TABLE 4—Softwood and Hardwood Volume by Age Classes and Cover Types .....	16	TABLE 13—General Stand Volume Table .....	27
TABLE 5—Softwood and Hardwood Volume by Cover Types and Size Classes .....	18	TABLE 14—Utilization by Forest Products—Average Annual Production .....	28
TABLE 6—Wood Volume by Species and Size Classes .....	20	TABLE 15—Annual Permissible Depletion by Species	28
TABLE 7—Cubic Foot Volume per Acre—Softwood and Hardwood—by Age Classes and Cover Types .....	22	TABLE 16—Annual Permissible Depletion — Black Spruce and Jack Pine .....	28
TABLE 8—Area Classification by Working Circles ..	24	TABLE 17—Cull Factor by Species .....	32
TABLE 9—Area Classification of Productive Forest by Working Circles, Cover Types and Mer- chantability .....	25	TABLE 18—Rotation by Species .....	32



## *Figures*

	Page		Page
FIG. 1—Land and Water Area by Ownership .....	12	FIG. 6—Comparison of Softwood and Hardwood Volume by Age Classes (Crown) .....	17
FIG. 2—Merchantable Area and Volume (Crown) ..	13	FIG. 7—Comparison of Sawtimber and Cordwood Volume for Softwood and Hardwood (Crown) ..	19
FIG. 3—Crown Area by Land Classes .....	15	FIG. 8—Merchantable Softwood Volume by Age and Size Classes (Crown) .....	19
FIG. 4—Productive Forest Land (Crown) by Cover Type and Merchantability .....	15	FIG. 9—Merchantable Hardwood Volume by Age and Size Classes (Crown) .....	21
FIG. 5—Merchantable Area and Volume by Age Classes (Crown) .....	15	FIG. 10—Merchantable Volume by Species .....	23

## *Illustrations*

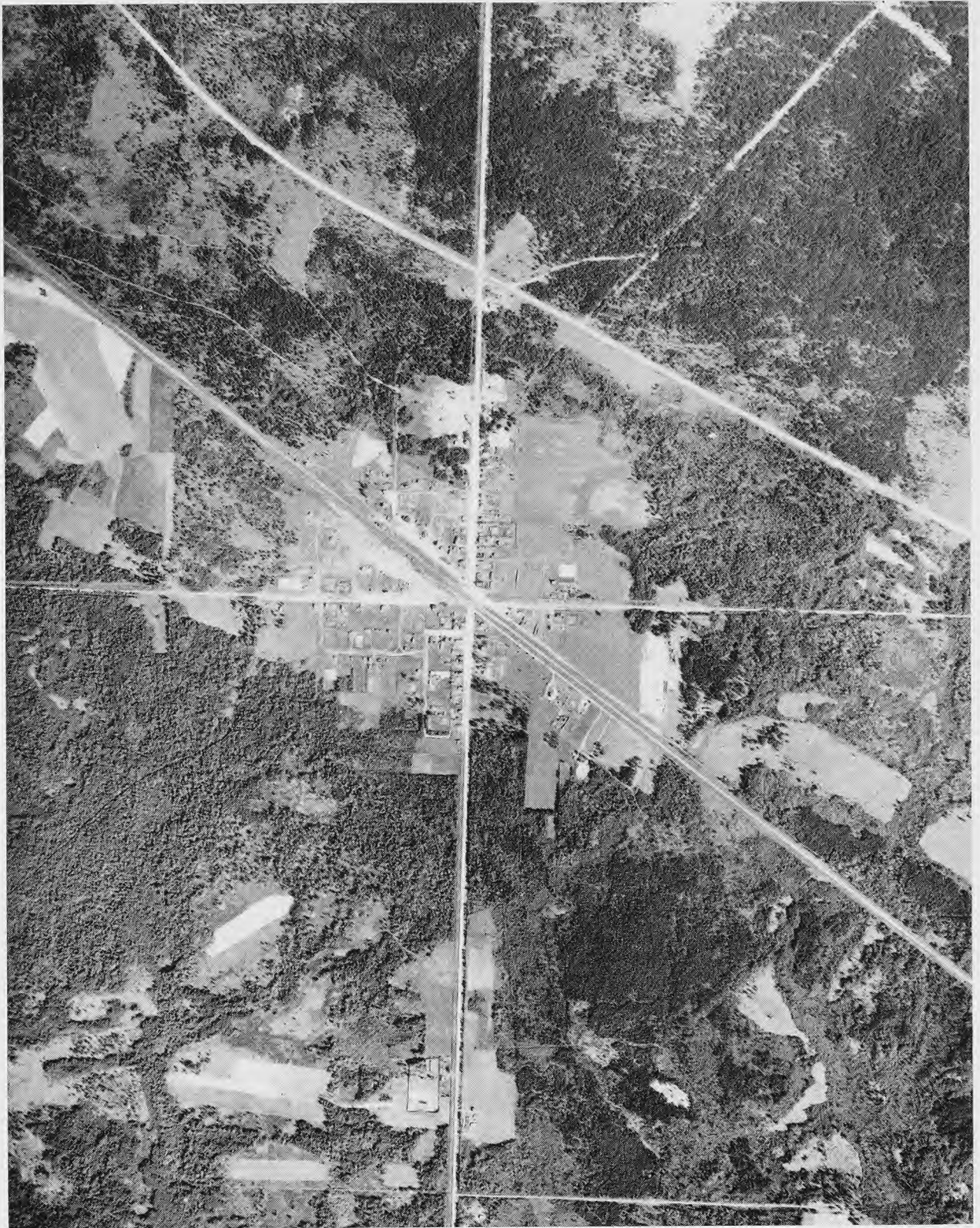
ILLUS. 1—Forest Resources Inventory Photograph of the Village of Woodridge—Scale: 4 inches to the mile .....	7	ILLUS. 4—Winter work in the Forest—loading Jack Pine Hydro Poles to be hauled to creosoting plant .....	13
ILLUS. 2—An old stand of White Cedar in South- eastern Manitoba, Frontispiece .....	8	ILLUS. 5—Smaller Jack Pine is used for Pulpwood ..	17
ILLUS. 3—Hadashville Ranger Station, a typical Ranger District Headquarters .....	11	ILLUS. 6—Experimental Cutting in mixed Red Pine- Jack Pine Stand (Federal Forestry Branch) ....	21
		ILLUS. 7—Areas not restocking naturally are planted	29

## *Maps*

MAP NO. 1—Forest Inventory Sections .....	6	MAP NO. 3—Upland Area, above Upper Campbell Beach of Lake Agassiz .....	11
MAP NO. 2—Southeastern Forest Section showing Working Circles .....	10		







*Forest Resources Inventory Photograph of the Village of Woodridge—Scale 4 Inches to the Mile.*



*An Old Stand of White Cedar.*



# Forest Resources

## SOUTHEASTERN FOREST SECTION

### Location and Area

The Southeastern Forest Section is bounded on the south by the State of Minnesota and on the east by the Northwest Angle territory of Minnesota and by the Province of Ontario. The northern boundary coincides with the southern border of the Whiteshell Forest Reserve and with the northern

limit of township nine west of the Forest Reserve. The western boundary is the range line between ranges eight and nine E.P.M., which line is approximately at the eastern edge of the main settled area. The total area covered by this report is 1,783,422 acres. This area excludes Indian Reserve lands but includes all other areas of Crown and patented land within the boundaries hatched on Map No. 2.

Table 1

Area Classification—Southeastern Forest Section

Class of area	Crown land		Patented land		Total	
	acres	% of land area	acres	% of land area	acres	% of land area
Productive forest land*	804,123	54.9	103,348	40.4	907,471	52.7
Potentially productive forest land†	116,225	7.9	63,656	24.9	179,881	10.4
Non-productive forest‡	294,145	20.1	27,011	10.5	321,156	18.7
Permanently non-forested land‡	251,097	17.1	61,957	24.2	313,054	18.2
TOTAL LAND.....	1,465,590	100.0	255,972	100.0	1,721,562	100.0
TOTAL WATER.....	61,807	4.2	53	0.0	61,860	3.6
TOTAL AREA.....	1,527,397		256,025		1,783,422	

\*Land supporting merchantable timber or young growth which will produce merchantable timber within a reasonable time.

†Cut-over, burn, brush or grassland, not now supporting productive forest, but capable of doing so.

‡Land with a forest cover such as treed muskeg, treed rock, and willow or alder swamp, but incapable of producing a forest crop of merchantable size within a reasonable time.

§Includes marsh, muskeg, rock, meadow, developed agricultural land, urban areas, roads and railroads. In general lands not expected to produce forest of any kind.

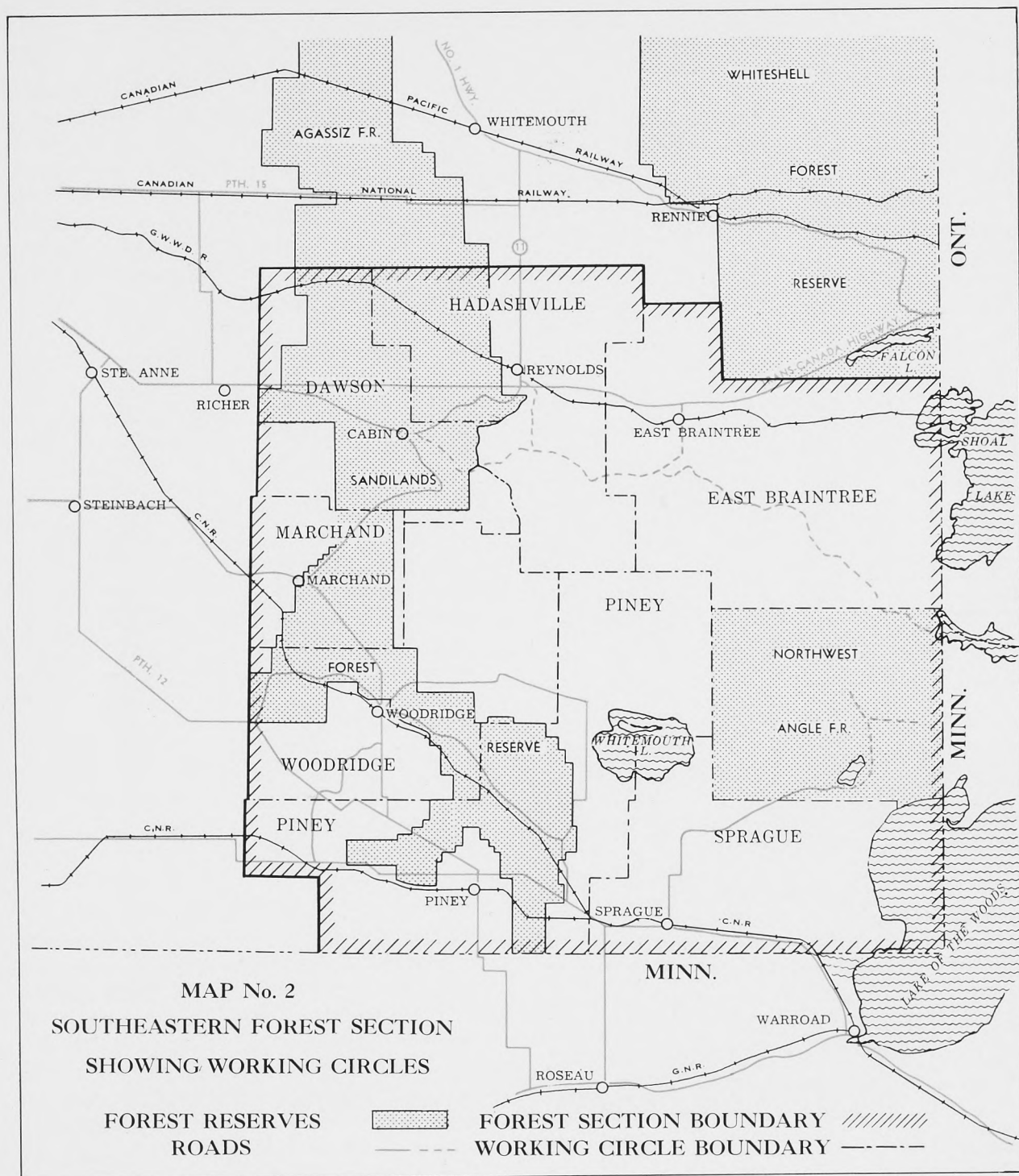
Table 2

Classification of Productive Forest Land by Cover Types and Tenure—Southeastern Forest Section

Cover type	Crown land		Patented land		Total	
	acres	%	acres	%	acres	%
S: Over 75% softwood.....	571,061	71.0	28,607	27.7	599,668	66.1
M: 50-75% softwood.....	56,736	7.1	6,344	6.1	63,080	7.0
N: 25-50% softwood.....	30,047	3.7	2,072	2.0	32,119	3.5
H: Under 25% softwood.....	146,279	18.2	66,325	64.2	212,604	23.4
TOTAL.....	804,123	100.0	103,348	100.0	907,471	100.0

### Geology

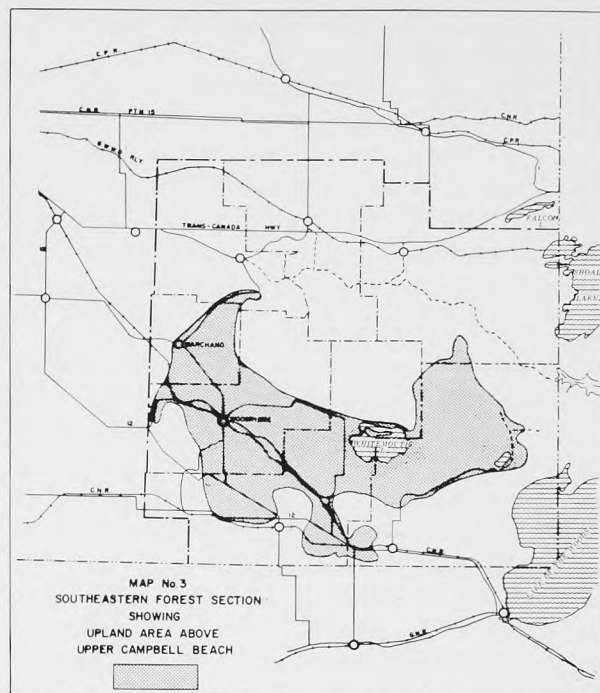
The underlying rock consists of Pre-Cambrian formations to the east and Ordovician to the west. There is an unconformable contact buried beneath heavy drift deposits along a line running approximately through Sprague and Hadashville. The few outcrops of Pre-Cambrian are mainly coarse-grained, light-colored granites, although there are outcrops of fine-grained, dark-colored basic rock on the shores of Shoal Lake and at Glenn on the G.W.W.D. railway. No outcrops of Ordovician rock occur but well borings reveal the presence of limestone beneath the drift in the western part of the area.





The amount of exposed rock is so small as to have practically no effect on the soils of the district. On the other hand, the effects of glaciation are very great, in fact the parent material of all Manitoba soils is directly, or indirectly, glacial in origin. The advancing ice picked up a great deal of material ranging in size from clay particles, through silt, sand, gravel, to boulders. The recession of the ice sheet resulted in various deposits depending on whether the retreat was steady or interrupted. A steady and rapid retreat resulted in the deposition of a mantle of ground moraine of more or less even thickness consisting of soil particles of all sizes. Whenever the advance of the ice was in balance with its melting there was formed at its front a recessional moraine consisting of unsorted material and with a very irregular surface. A third type of topography was formed when glacial outwash spreading out beyond the ice margin covered the ground moraine. The above land forms were again modified when post-glacial Lake Agassiz was formed in front of the glacier on account of the original drainage channels being blocked by the ice sheet. Deposits in the glacial lake varied from clay to sand, but in any case the materials were well sorted, differing from the morainic material in this respect. All the above land forms are found in southeastern Manitoba.

The margin of old Lake Agassiz is marked by a series of beaches, sand spits, off-shore bars and wave-cut terraces which register different levels of the lake. The higher part of the country appears



never to have been covered by the lake, with the result that this island of higher land was surrounded by a series of sand and gravel beaches. These hills form part of a recessional moraine or possibly an interlobate moraine where the Keewatin and Patricia ice sheets coalesced. As the lake retreated towards the Red River and Lake Winnipeg this higher land ceased to be an island and lower beaches were laid down on its western side only.

### Topography

The most conspicuous topographic feature is the elevated tract of country extending from the neighborhood of Marchand Ranger Station southeast along the railway to South Junction where it extends northeast to the vicinity of the Dawson Road. See Map No. 3. The whole forms an arc or horse-shoe with the points to the north. The western slope of this highland area forms something of an escarpment rising about 250 feet in three miles in the vicinity of the Marchand lookout tower.

Enclosed within the arc is Whitemouth Lake and the valley of the Whitemouth River which drains north to the Winnipeg River. Small rivers drain the eastern slopes to the Lake of the Woods. The southern and western slopes drain to the Roseau and to the main Red River by the Sprague, Rat and



*Hadashville Ranger Station—a typical Ranger District Headquarters.*

Seine Rivers, while the Brokenhead River runs northwest to Lake Winnipeg.

The highest elevation in this Forest Section is at Marchand lookout tower about 1,300 feet above sea level, while the lowest is about 900 feet where the Brokenhead River leaves the area. The Lake of the Woods to the east has an elevation of 1,060 feet, while the two lakes in the interior, Whitemouth and Moose, are at about the 1,130 foot level.

### Soils

The highlands above 1,200 feet elevation consists of undulating siliceous sandy drift with granitoid boulders in a few places. The areas below 1,200 feet consist of fairly level calcareous till which in many places is covered by sand washed down from the uplands. Extensive bogs occur below the 1,200 foot level where drainage is poor, with the resultant formation of peat soils.

Soil surveys have covered only a few local areas but indications are that most of the Southeastern Forest Section may be included in the Grey-Wooded Zone of the Manitoba Soil Survey. The typical soils of this zone have been influenced by the high lime composition of their parent material and by the forest cover. There is, however, a fairly extensive area occupying the higher levels which consists of deep siliceous sand usually supporting jack pine which is acid and may be described as a

Podzol. The name "Menisino" has been accepted for this Soil Association.

Out of the total land area of 1,721,562 acres about 320,000 acres have been tentatively classified as agricultural. Further soil surveys may indicate some other lands which could with suitable drainage be made suitable for some form of agriculture, but it appears probable that at least two-thirds of the total land area of this Forest Section will be permanently dedicated to the production of forest crops.

The agricultural soils consist of the alluvial deposits along streams, the deeper deposits of fine textured material over sand or till, and some areas of till soil with or without a shallow surface deposit of fine to medium textured material. The best farming areas are found along the southern border and along the Whitemouth River in the north.

### Climate

The Southeastern Forest Section has a higher annual precipitation than any other part of Manitoba. Sprague is the only weather station within the area but using Oakbank to the west, and Kenora to the east, it would appear that the average annual precipitation is between 20 and 25 inches. This may be compared with precipitation of between 15 and 20 inches in the agricultural zone west of the Red

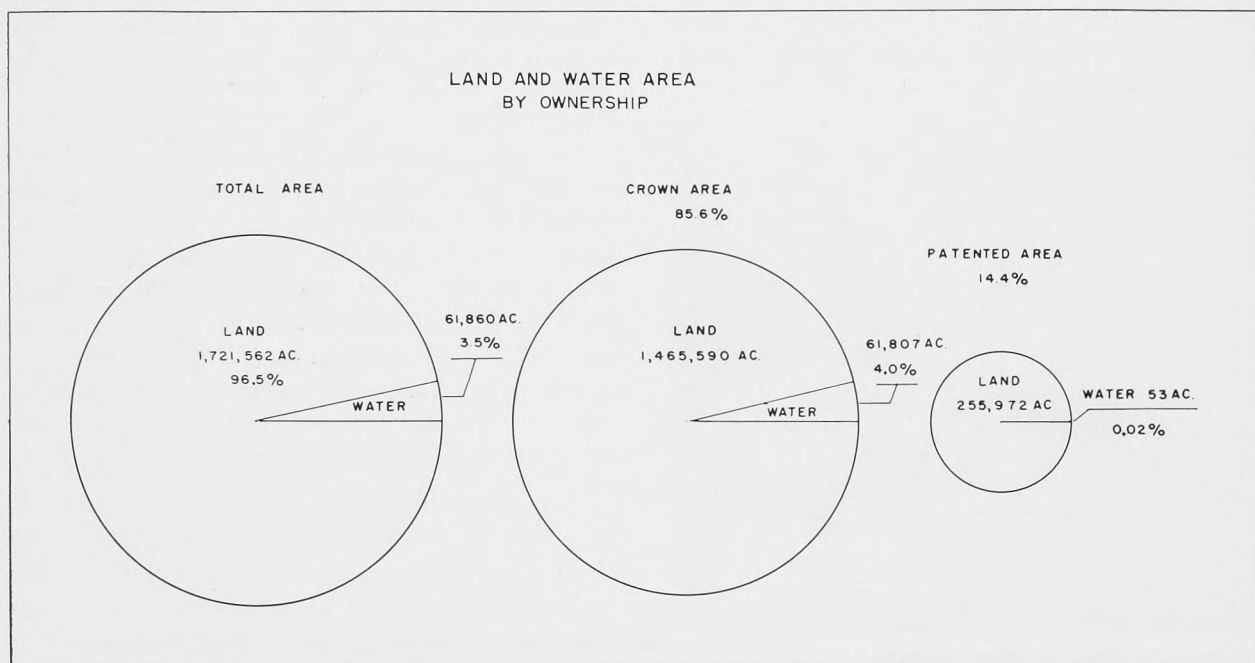


Figure 1.

River. The Forest Zone in general, north and northwest of the Southeastern Section also has a lower annual precipitation ranging between 20 inches in the south to 15 inches in the north.

Records of temperature for the Section are rather sketchy but the mean annual temperature appears to be a little lower than for points in corresponding latitudes on the Red River. Most of the annual growth of vegetation takes place during the months of June and July, and for this reason the temperature records for this period are of special interest. A study made some years ago showed that the average mean temperature for these two months was about two degrees cooler at Sprague and Waugh than it was on the Red River. The average length of the period free from killing frost, taken as 29.5 degrees, is between 115 and 125 days as compared with about 130 days at Morris to the west.

### Forest Composition

The combination of higher precipitation and lower temperatures which is indicated above gives a higher precipitation effectiveness, i.e., leaves considerably more water available for plant growth than is found in the prairies to the west. This makes for a climate favorable to tree growth. The higher

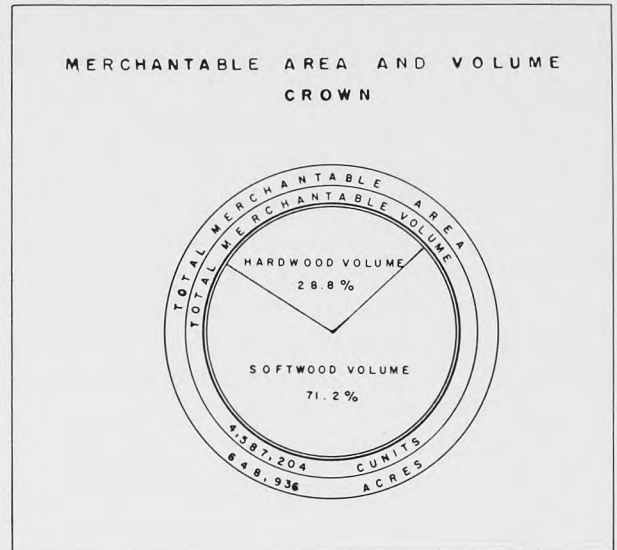


Figure 2.

precipitation as compared with the forests to the north and northwest is probably responsible for the occurrence of a few tree species as well as a number of shrubs and herbs which are not found growing naturally in other parts of Manitoba. White pine, red pine and white cedar are found 18, 48 and 60 miles respectively west of the Ontario border. A



Winter Work in the Forest—Loading Jackpine Hydro Poles to be Hauled to Creosoting Plant.



few occurrences of large-toothed aspen and hop hornbeam have been noted near Piney and Marchand, respectively.

Apart from the occasional occurrence of the trees mentioned above, the forest of this Section is somewhat similar to that found on the Pre-Cambrian areas to the north. Black spruce makes up 37 per cent of the volume, aspen 21 and jack pine 19 per cent. Tamarack is more prevalent than in other forest sections amounting to seven per cent of the whole while the proportion of white spruce is un-

usually low, being only three per cent. Minor species separated in the inventory figures are balsam poplar, white birch, balsam fir and cedar. Red pine and white pine on account of their scarcity were tallied with jack pine.

### Settlement and Development

The first historical records show Indians of the Cree nation located around the Lake of the Woods. They were in contact with Assiniboines to the west and other Crees to the north. A more or less continuous war seems to have existed between the

**Table 3**  
*Area Classification of Productive Forest by Age Classes, Cover Types and Merchantability—Southeastern Forest Section*

AGE CLASS <i>years</i>	COVER TYPES IN ACRES									
	S		M		N		H		Total	
	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch
CROWN LANDS										
0 - 20.....	28,939	5,856	4,954	150	2,127	253	16,922	7,903	52,942	14,162
21 - 40.....	83,016	132,868	485	15,265	.....	7,867	700	36,019	84,201	192,019
41 - 60.....	15,186	139,916	240	26,652	.....	14,201	50	48,464	15,476	229,233
61 - 80.....	2,568	138,394	.....	7,059	.....	4,764	.....	33,431	2,568	183,648
81 - 100.....	.....	4,429	.....	1,931	.....	835	.....	2,504	.....	9,699
101 - over.....	.....	19,889	.....	.....	.....	.....	.....	286	.....	20,175
SUB-TOTAL.....	129,709	441,352	5,679	51,057	2,127	27,920	17,672	128,607	155,187	648,936
TOTAL.....	571,061		56,736		30,047		146,279		804,123	
PATENTED LANDS										
0 - 20.....	6,175	589	1,991	733	24	32	28,768	5,348	36,958	6,702
21 - 40.....	4,013	6,231	215	1,713	.....	786	32	22,501	4,260	31,231
41 - 60.....	542	6,503	.....	1,349	.....	891	.....	6,218	542	14,961
61 - 80.....	53	4,014	.....	342	.....	339	.....	3,358	53	8,053
81 - 100.....	.....	47	.....	1	.....	.....	.....	.....	.....	48
101 - over.....	.....	440	.....	.....	.....	.....	.....	100	.....	540
SUB-TOTAL.....	10,783	17,824	2,206	4,138	24	2,048	28,800	37,525	41,813	61,535
TOTAL.....	28,607		6,344		2,072		66,325		103,348	
ALL LANDS										
0 - 20.....	35,114	6,445	6,945	883	2,151	285	45,690	13,251	89,900	20,864
21 - 40.....	87,029	139,099	700	16,978	.....	8,653	732	58,520	88,461	223,250
41 - 60.....	15,728	146,419	240	28,001	.....	15,092	50	54,682	16,018	244,194
61 - 80.....	2,621	142,408	.....	7,401	.....	5,103	.....	36,789	2,621	191,701
81 - 100.....	.....	4,476	.....	1,932	.....	835	.....	2,504	.....	9,747
101 - over.....	.....	20,329	.....	.....	.....	.....	.....	386	.....	20,715
SUB-TOTAL.....	140,492	459,176	7,885	55,195	2,151	29,968	46,472	166,132	197,000	710,471
TOTAL.....	599,668		63,030		32,119		212,604		907,471	

Crees and the Sioux who inhabited the prairies to the southwest.

The first definite record of white exploration is that of Pierre La Verendrye who built a fur-trading post at the Northwest Angle of the Lake of the Woods in 1732. Trips were made across country to the Red River in winter, and for a short time the summer route to the west seems to have been by Reed River, Savanne portage to Mud Creek, thence down the Sprague and Roseau Rivers to the Red. This route was soon abandoned as a main route in favor of the Winnipeg River but continued to be used in the local fur trade which for many years was the only industry. There is no record of any fur-trading post actually in the area but the American Fur Company established a post at Warroad, a short distance south of the 49th parallel, in 1820, and later in 1848 the Hudson's Bay Company had a post near Roseau Lake a little further west.

The establishment of the Red River settlement in 1812 had little effect on this somewhat isolated Southeastern Section. There was a flurry of activity following the surrender of Rupertsland to the Dominion of Canada in 1869. The Dawson Road was built between the Northwest Angle and Fort Garry and a stage coach service was initiated. This route was abandoned when the Canadian Pacific Railway reached Winnipeg in 1880.

Settlement in the Red River valley and westward proceeded at a rapid pace from 1871 onward, and consequently there was a heavy demand for lumber.

CROWN AREA  
DISTRIBUTED INTO LAND CLASSES

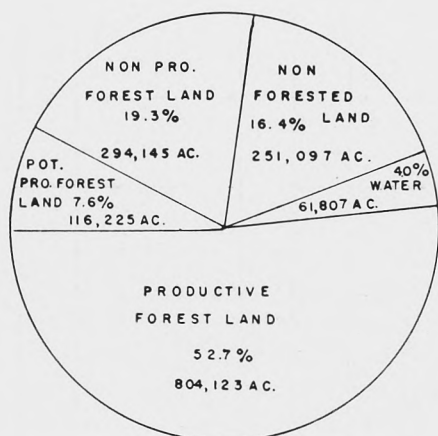


Figure 3.

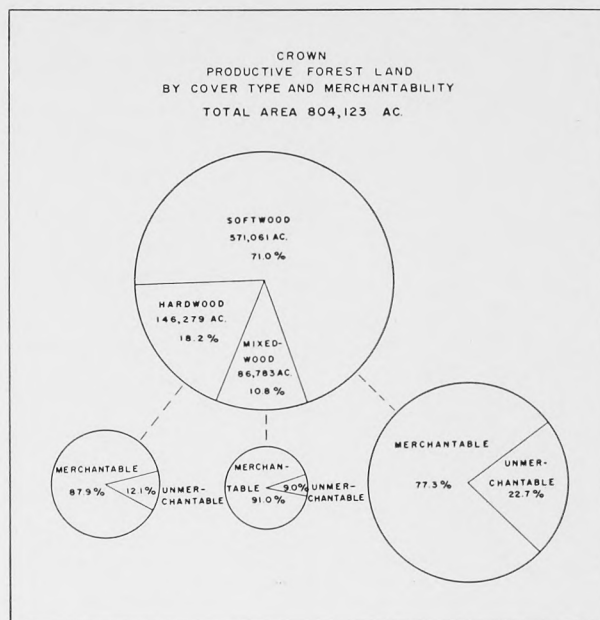


Figure 4.

The Red River with its eastern tributaries coming from the forested area of southeastern Manitoba and northwestern Minnesota offered a ready highway for the transportation of saw logs for the saw-mills which opened up at Winnipeg. White pine and red pine logs were in main demand but, no doubt, considerable white spruce, cedar and jack pine was also cut. Most of the Manitoba production came down the Roseau River from what is now the Sprague district. The Sprague lumber company operated a large timber berth in the vicinity of Moose Lake following a disastrous forest fire in

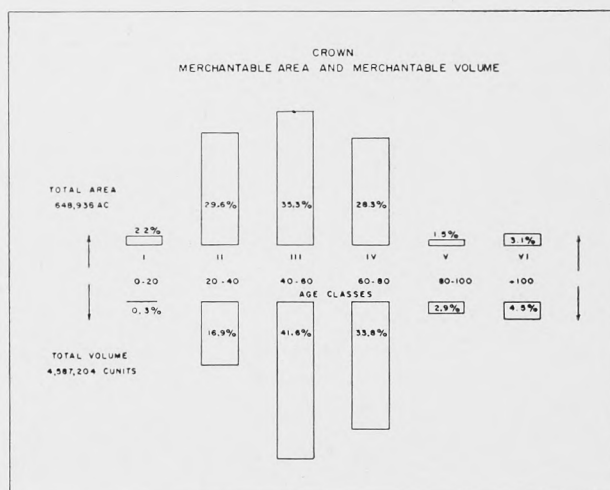


Figure 5.

**Table 4**  
*Softwood and Hardwood Volume by Age Classes and Cover Types—Southeastern Forest Section*

*VOLUME IN CUNITS BY COVER TYPES (1 Cunit Equals 100 Cubic Feet of Wood)											
Age Class <i>years</i>	S			M			N			H	
	Hardwood		Total	Softwood		Total	Softwood		Total	Hardwood	
	Hardwood	Softwood	Total	Hardwood	Softwood	Total	Hardwood	Softwood	Total	Hardwood	Softwood
CROWN LANDS											
0 - 20.....	2,694	2,750	5,444	48	171	219	110	232	1,737	10,411	12,148
21 - 40.....	456,900	473,940	929,840	30,056	89,347	119,403	24,522	45,308	19,241	149,033	168,274
41 - 60.....	1,041,802	1,062,317	2,104,119	98,174	285,854	384,028	64,238	116,580	58,465	383,261	441,726
61 - 80.....	1,092,432	1,017,496	2,109,928	54,215	80,632	134,847	18,408	31,254	25,412	395,712	421,124
81 - 100.....	45,988	47,446	93,434	12,364	32,528	44,892	6,519	13,413	593	37,388	37,981
101 - over.....	198,095	201,833	400,928	.....	.....	.....	.....	.....	76	4,774	4,850
TOTAL.....	2,747,911	2,805,782	5,553,693	167,059	488,532	655,591	113,797	206,787	105,524	980,579	1,086,103
										3,267,898	4,353,991
										1,319,306	4,587,204
PATENTED LANDS											
0 - 20.....	228	248	476	204	521	725	15	27	966	4,276	5,242
21 - 40.....	16,058	16,668	32,726	2,216	6,381	8,597	6,173	7,557	10,826	61,239	72,065
41 - 60.....	31,657	32,562	64,219	2,637	7,409	10,046	1,459	3,153	4,420	41,154	45,574
61 - 80.....	26,844	27,582	54,426	493	1,493	1,986	1,153	2,037	1,732	43,608	45,340
81 - 100.....	243	257	499	2	6	8	.....	.....	.....	.....	.....
101 - over.....	3,118	3,220	6,338	.....	.....	.....	.....	.....	27	1,670	1,697
TOTAL.....	78,148	80,537	158,685	5,552	15,810	21,362	8,797	12,774	17,971	151,947	169,918
										168,685	279,039
ALL LANDS											
0 - 20.....	2,922	2,998	5,920	252	692	944	137	259	2,703	14,687	17,390
21 - 40.....	472,958	490,608	963,566	32,272	95,728	128,000	30,695	52,865	30,067	210,272	240,339
41 - 60.....	1,073,459	1,094,879	2,168,338	100,811	293,263	394,074	65,697	119,733	62,885	424,415	487,300
61 - 80.....	1,029,276	1,045,078	2,074,354	26,910	82,125	109,035	19,561	33,291	27,144	439,320	466,464
81 - 100.....	46,231	47,703	93,934	12,366	32,534	44,900	6,519	13,413	593	37,388	37,981
101 - over.....	201,213	203,053	404,266	.....	.....	.....	.....	.....	103	6,444	6,547
TOTAL.....	2,826,059	2,886,319	5,712,378	172,611	504,342	676,953	122,594	219,561	123,495	1,132,526	1,256,021
										3,378,252	4,487,991
										4,866,243	5,712,378

\*Net Roundwood Volume: Stump height 1', top diameter 3"; one stacked cord equals approximately 85 cubic feet of wood.



1891. Large white pine and cedar stumps from this operation are still visible. Saw logs from this berth were driven by way of the Sprague, Roseau and Red Rivers to the mill located in Winnipeg. The opening of the Canadian Pacific main line between Fort William and the Red River in 1880 gave a new outlet to the saw logs of the region by way of the Whitemouth River. Spruce logs and some red pine were cut along the river in and above the present Hadashville settlement, and driven down the river to the mill of David Ross which operated at the village of Whitemouth from 1879 to 1900.

The building of the Canadian Northern Railway through the Forest Section in 1901 brought the district out of its relative isolation and settlement commenced along the railway. The northern part of the area was opened up by the construction of the Greater Winnipeg Water District railway in 1914. This line was built in connection with the pipe-line which brings water from Shoal Lake to Winnipeg.

Some stable settlements have been established, notably, in the vicinity of Middleboro, Sprague, Piney, Sundown, Whitemouth Lake, St. Labre and Hadashville. Unfortunately, much of the land first

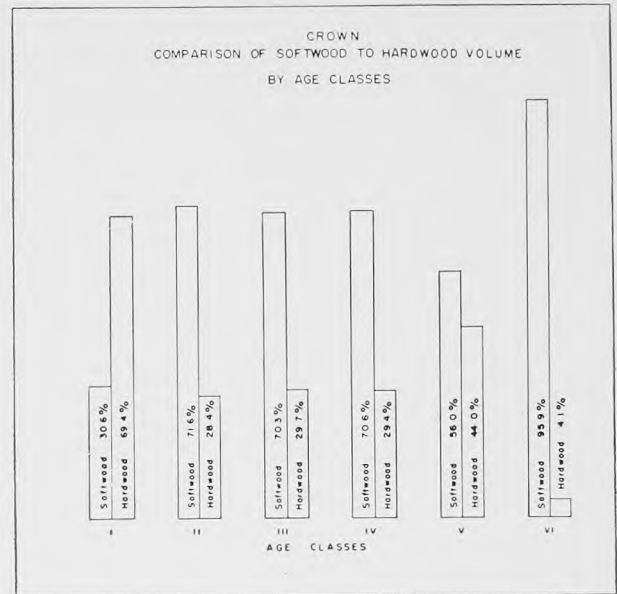


Figure 6.

homesteaded was on sand ridges best suited for the growing of jack pine, while the better soils with a heavy growth of spruce and poplar were left undeveloped on account of the difficulty of clearing. The lighter lands near the railway were cleared of



*Smaller Jackpine is Used for Pulpwood.*

**Table 5**  
*Softwood and Hardwood Volume by Cover Types and Size Classes—Southeastern Forest Section*

Cover type	VOLUME IN CUNITS (100 cu. ft. Units)								
	Softwood			Hardwood			Total		
	4" - 9"	10" +	Total	4" - 9"	10" +	Total	4" - 9"	10" +	Total
<b>CROWN LANDS</b>									
S.....	2,638,599	109,312	2,747,911	51,996	5,875	57,871	2,690,595	115,187	2,805,782
M.....	243,839	77,634	321,473	86,967	80,092	167,059	330,806	157,726	488,532
N.....	68,396	24,594	92,990	57,464	56,333	113,797	125,860	80,927	206,787
H.....	89,086	16,438	105,524	496,844	483,735	980,579	585,930	500,173	1,086,103
<b>TOTAL.....</b>	<b>3,039,920</b>	<b>227,978</b>	<b>3,267,898</b>	<b>693,271</b>	<b>626,035</b>	<b>1,319,306</b>	<b>3,733,191</b>	<b>854,013</b>	<b>4,587,204</b>
<b>PATENTED LANDS</b>									
S.....	74,734	3,414	78,148	2,247	142	2,389	76,981	3,556	80,537
M.....	7,627	2,631	10,258	3,129	2,423	5,552	10,756	5,054	15,810
N.....	2,112	1,865	3,977	4,020	4,777	8,797	6,132	6,642	12,774
H.....	16,388	1,583	17,971	81,369	70,578	151,947	97,757	72,161	169,918
<b>TOTAL.....</b>	<b>100,861</b>	<b>9,493</b>	<b>110,354</b>	<b>90,765</b>	<b>77,920</b>	<b>168,685</b>	<b>191,626</b>	<b>87,413</b>	<b>279,039</b>
<b>ALL LANDS</b>									
S.....	2,713,333	112,726	2,826,059	54,243	6,017	60,260	2,767,576	118,743	2,886,319
M.....	251,466	80,265	331,731	90,096	82,515	172,611	341,562	162,780	504,342
N.....	70,508	26,459	96,967	61,484	61,110	122,594	131,992	87,569	219,561
H.....	105,474	18,021	123,495	578,213	554,313	1,132,526	683,687	572,334	1,256,021
<b>TOTAL.....</b>	<b>3,140,781</b>	<b>237,471</b>	<b>3,378,252</b>	<b>784,036</b>	<b>703,955</b>	<b>1,487,991</b>	<b>3,924,817</b>	<b>941,426</b>	<b>4,866,243</b>

timber by fire and cutting, and as soon as this took place the settler on this type of land had no further source of income from the land. The pulpwood boom of the 1920's furnished employment for settlers cutting spruce on private lands but with the arrival of the economic depression of the early 1930's this source of income was cut off. Much of the land came into the possession of the local municipalities as a result of non-payment of taxes. The four organized municipalities located within this Forest Section had all lost their charters before the end of the depression and local affairs are now handled by the Provincial Government. In addition, three municipalities to the west surrendered the eastern portions of their territory to the central government so that there is now no municipal government in this Forest Section.

During the last fifteen years relatively small areas of better land have been opened up to agriculture,

but farmers are relying less on grain growing and more on livestock and forage crops. Up to the present time private owners have shown very little interest in wood lot development although a movement in this direction may be predicted for the future. The forest on Crown lands is the main resource but it has suffered from the neglect which followed its early exploitation. Blueberries are an important minor product of the forests of the district.

Fur products taken in this area include mink, weasel, lynx, skunk, beaver, muskrat, squirrel, and an occasional fisher. White-tail deer are common. Moose are found and a small herd of caribou occupied the central swamp areas until a few years ago. Timber wolves are an important predator. Wild geese use Whitemouth Lake as a resting place on migration, and are also known to nest in the St. Labre swamp.

CROWN  
COMPARISON OF SAWTIMBER TO CORDWOOD VOLUME  
FOR SOFTWOOD AND HARDWOOD



Figure 7.

The Manitoba Power Commission completed its program of rural electrification connecting all villages and farms in the Forest Section by 1955. This forward step should ultimately lead to the establishment of more wood using industries. Under recent highway development may be mentioned the Trans-Canada Highway which crosses the northern part of the Forest Section and No. 12 Highway which traverses the southern portion. A road is now planned along the eastern boundary which will connect the Whiteshell via Moose Lake to the U.S.A. highway system. This road will stimulate summer resort development which has already been started at Moose Lake on the Northwest Angle Forest Reserve.

### Forest Administration

The first steps in forest administration in south-eastern Manitoba were made by the Department of the Interior in 1908 when a fire-ranging staff was established. In 1923 an important advance was made when an area of 189 square miles including the higher parts of the sandy uplands was set aside as the Sandilands Forest Reserve. A system of lookout towers, telephone lines, roads and administrative sites was initiated, a permanent forestry staff

was assigned to the area and by 1925 a detailed inventory had been completed.

In 1930 with the transfer of the natural resources to the Province a reorganization of forestry administration took place. The administration of timber disposal, fire protection and other phases of forestry was combined under the Forest Service, Depart-

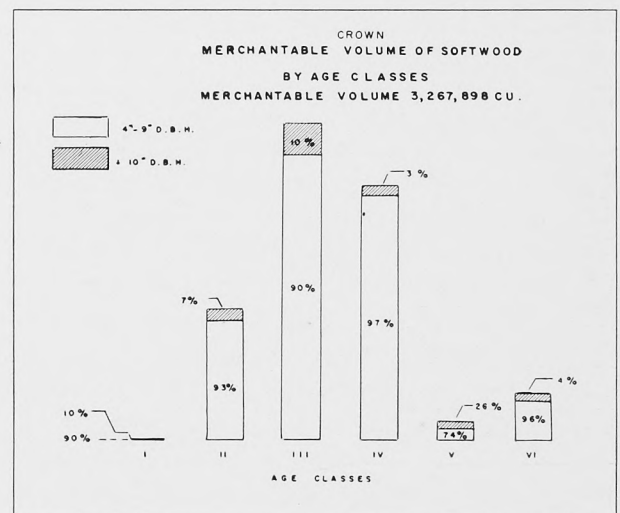


Figure 8.



**Table 6**  
*Softwood and Hardwood Volume by Species and Size Classes—Southeastern  
Forest Section*

	*CUNITS BY DIAMETER CLASSES						†SAW TIMBER
Species	Total		4'' - 9'' D.B.H.		10'' + D.B.H.		10'' and Over M.F.B.M.
	<i>volume</i>	<i>per cent</i>	<i>volume</i>	<i>per cent</i>	<i>volume</i>	<i>per cent</i>	
CROWN LANDS							
White spruce.....	145,851	3	118,927	3	26,924	3	12,116
Black spruce.....	1,697,770	37	1,671,015	45	26,755	3	12,040
Balsam fir.....	124,458	3	91,977	2	32,481	4	14,616
Jack pine.....	882,769	19	772,020	21	110,749	13	49,837
Tamarack.....	316,162	7	307,212	8	8,950	1	4,028
Cedar.....	100,888	2	78,769	2	22,119	3	9,953
TOTAL SOFTWOOD.....	3,267,898	71	3,039,920	81	227,978	27	102,590
Aspen.....	956,187	21	469,541	13	486,646	57	218,991
Balsam poplar.....	224,845	5	138,147	4	86,698	10	39,014
White birch.....	138,274	3	85,583	2	52,691	6	23,711
TOTAL HARDWOOD.....	1,319,306	29	693,271	19	626,035	73	281,716
TOTAL ALL SPECIES.....	4,587,204	100	3,733,191	100	854,013	100	384,306
PATENTED LANDS							
White spruce.....	3,736	1	2,575	1	1,161	1	523
Black spruce.....	52,391	19	51,631	27	760	1	342
Balsam fir.....	12,048	6	10,658	6	1,390	2	625
Jack pine.....	29,830	10	24,556	13	5,274	6	2,373
Tamarack.....	10,847	4	10,288	5	559	1	252
Cedar.....	1,502	0	1,153	1	349	0	157
TOTAL SOFTWOOD.....	110,354	40	100,861	53	9,493	11	4,272
Aspen.....	117,102	42	63,203	33	53,899	62	24,255
Balsam poplar.....	28,761	10	16,200	8	12,561	14	5,652
White birch.....	22,822	8	11,362	6	11,460	13	5,157
TOTAL HARDWOOD.....	168,685	60	90,765	47	77,920	89	35,064
TOTAL ALL SPECIES.....	279,039	100	191,626	100	87,413	100	39,336
ALL LANDS							
White spruce.....	149,587	3	121,502	3	28,085	3	12,639
Black spruce.....	1,750,161	36	1,722,646	44	27,515	3	12,382
Balsam fir.....	136,503	3	102,635	3	33,871	4	15,241
Jack pine.....	912,599	19	796,576	20	116,023	12	52,210
Tamarack.....	327,009	7	317,500	8	9,509	1	4,280
Cedar.....	102,390	2	79,922	2	22,468	2	10,110
TOTAL SOFTWOOD.....	3,378,252	70	3,140,781	80	237,471	25	106,862
Aspen.....	1,073,289	22	532,744	14	540,545	57	243,246
Balsam poplar.....	253,606	5	154,347	4	99,259	11	44,666
White birch.....	161,096	3	96,945	2	64,151	7	23,868
TOTAL HARDWOOD.....	1,487,991	30	784,036	20	703,955	75	316,780
TOTAL ALL SPECIES.....	4,866,243	100	3,924,817	100	941,426	100	423,642

†Saw timber figures were obtained by converting the cubic foot volume of the size class, 10" D.B.H. and over, to board feet on the assumption that one cubic foot is equal to 4.5 board feet.

\*One cunit equals 100 cubic feet of wood; one cord equals 85 cubic feet of wood.

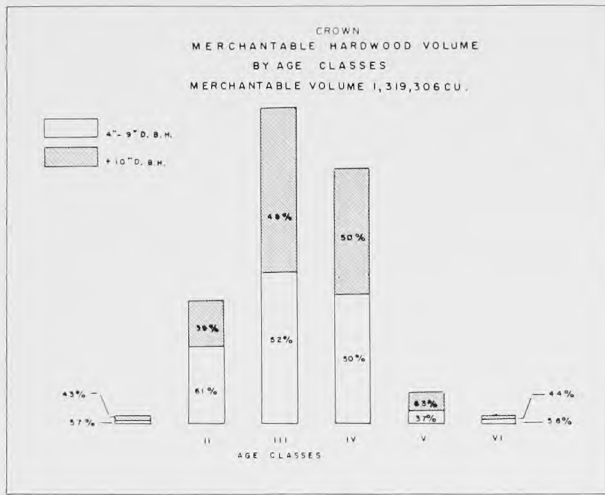


Figure 9.

ment of Mines and Natural Resources. The South-eastern Forest Section was divided into Forest Ranger Districts with permanent Forest Rangers under the supervision of a District Forester.

At the present time forestry administration is under a District Forester with an office at 469 Broadway, Winnipeg. He is responsible to the

Provincial Forester for the protection, management, utilization and reforestation of all forests on Crown lands within the Forest Section. In the areas set aside as Forest Reserves he has the additional responsibility of construction and maintenance of roads and of all land use. Each of the seven Ranger Districts (or Working Circles) has a Forest Ranger with headquarters in the Ranger District who is responsible to the District Forester for his Ranger District. The District Forester is assisted by two Foresters, one Senior Forest Ranger, a number of Engineering Aids and a clerical staff.

From 1943 onward considerable land classification survey work has been carried on. As a result of these studies the Sandilands Forest Reserve was extended southward to the International boundary in 1950, this extension taking in much abandoned farm land which had been heavily cut over. Further soil surveys to the north led to an extension in that direction in 1954, bringing the total area of the Reserve up to 573 square miles.

Preliminary soil examination in the Crown land areas east of the Sandilands Forest Reserve indicates that by far the larger proportion of the area



*Experimental cutting in mixed Red Pine-Jackpine stand (Federal Forestry Branch).*

**Table 7**  
*Cubic Foot Volume per Acre—Softwood and Hardwood by Age Classes and Cover Types—Southeastern Forest Section*

Age Class <i>years</i>	VOLUMES IN CUBIC FEET PER ACRE BY COVER TYPES														
	S			M			N			H			Total		
	Soft-wood	Hard-wood	Total	Soft-wood	Hard-wood	Total	Soft-wood	Hard-wood	Total	Soft-wood	Hard-wood	Total	Soft-wood	Hard-wood	Total
CROWN LAND															
0 - 20.....	46	1	47	82	32	114	48	43	91	22	132	154	33	75	108
21 - 40.....	344	13	357	388	197	585	264	312	576	53	414	467	290	115	405
41 - 60.....	745	15	760	704	338	1,072	369	452	821	121	790	911	585	247	832
61 - 80.....	724	11	735	768	374	1,142	270	386	656	76	1,184	1,260	596	248	844
81 - 100.....	1,038	33	1,071	1,044	640	1,684	826	780	1,606	24	1,493	1,517	759	595	1,354
101 - over.....	996	19	1,015	.....	.....	.....	.....	.....	.....	27	1,669	1,696	982	42	1,024
MERCHANTABLE.....	623	13	636	630	327	957	333	408	741	82	763	845	504	203	707
PRODUCTIVE FOREST.....	481	10	491	567	294	861	309	379	688	72	670	742	406	164	570
PATENTED LAND															
0 - 20.....	39	3	42	43	28	71	47	37	84	18	80	98	23	67	90
21 - 40.....	258	9	267	243	129	372	176	785	961	48	272	320	104	225	329
41 - 60.....	487	14	501	354	195	549	190	164	354	71	662	733	284	309	593
61 - 80.....	669	18	687	292	144	436	261	340	601	51	1,299	1,350	378	571	949
81 - 100.....	517	30	547	400	200	600	.....	.....	.....	.....	.....	.....	514	33	547
101 - over.....	709	23	732	.....	.....	.....	.....	.....	.....	27	1,670	1,697	582	328	910
MERCHANTABLE.....	439	13	452	248	134	382	194	430	624	48	405	453	179	274	453
PRODUCTIVE FOREST.....	273	9	282	162	87	249	192	425	617	27	229	256	107	163	270
ALL LAND															
0 - 20.....	45	1	46	50	29	79	48	43	91	20	111	131	30	73	103
21 - 40.....	340	13	353	374	190	564	256	355	611	51	359	410	264	130	394
41 - 60.....	733	15	748	687	360	1,047	358	435	793	115	776	891	566	251	817
61 - 80.....	723	11	734	746	362	1,108	269	383	652	74	1,194	1,268	587	262	849
81 - 100.....	1,033	33	1,066	1,044	640	1,684	826	780	1,606	24	1,493	1,517	758	592	1,350
101 - over.....	990	19	1,009	.....	.....	.....	.....	.....	.....	27	1,669	1,696	972	50	1,022
MERCHANTABLE.....	615	13	628	601	313	914	324	409	733	74	682	756	476	209	685
PRODUCTIVE FOREST.....	471	10	481	526	274	800	302	382	684	58	533	591	372	164	536

is best suited to forestry. In the meantime, the Northwest Angle Forest Reserve covering an area of 280 square miles was established in 1956. Nearly all remaining unsettled lands have been tentatively withdrawn from sale under the heading "General Reserve" pending the completion of soil surveys.

#### **Fire Protection**

The dry sandy ridges of southeastern Manitoba, covered with jack pine, dry out rapidly and present a higher than normal fire hazard throughout most of the summer. This, combined with the accessibility and heavy use of the forest area, has caused

a rather high fire incidence in the area. Furthermore, this type of forest is an ideal fuel type and during periods of drought fires can be extremely difficult to control.

In the early stages of the settlement of Manitoba fires raged over immense areas and no systematic attempt was made to check them. Later on when a system of fire-rangin was started, the difficulty of transportation and lack of effective fire-fighting equipment made suppression relatively ineffective. However, steady progress has been made up to the present time in detection, communication, and sup-



pression. There are now seven Ranger Districts each with permanent headquarters. Eleven steel lookout towers are in operation, each equipped with telephone, radio, or both, and a good start has been made on a system of access roads and fire-guards.

A preliminary fire plan was established in 1951 giving figures for "acceptable" area of burn in acres per year. This recognizes that a certain amount of fire damage is inevitable but sets a burned area objective for the region. Organization to meet this objective is being progressively implemented but, unfortunately, there have been a number of "disaster" fires in recent years with the result that the acceptable area of burn has been exceeded.

**Forest Inventory**

Financial assistance under the Canada Forestry Act commenced April 1st, 1951, but considerable inventory work done before this was consolidated with the official inventory. No new ground control was needed as the whole area had been subdivided under the Dominion Land System, First System,

and sufficient survey lines could be located on the aerial photographs. Air photography of ranges 9, 10 and 11 E.P.M. was done by the R.C.A.F. in 1946, and the area further east in 1949, the scale in both cases being 1:15,840.

Field parties cruised in the Woodridge and Piney Working Circles in the summers of 1949 and 1950. In the summer of 1951 a seven man party cruised in the Sprague and East Braintree Circles while a four man party covered the area north of White-mouth Lake. In these areas 895 plots of one-fifth acre were tallied on the basis of which stand volume tables for the Forest Section were prepared. Type checking in the fall and winter of 1951-52 covering parts of the Hadashville and Dawson Working Circles completed the field work for the Forest Section.

Tree volume tables and stand volume tables were prepared during the winter of 1951-52 using data obtained from the sample plots. Table 13 shows the

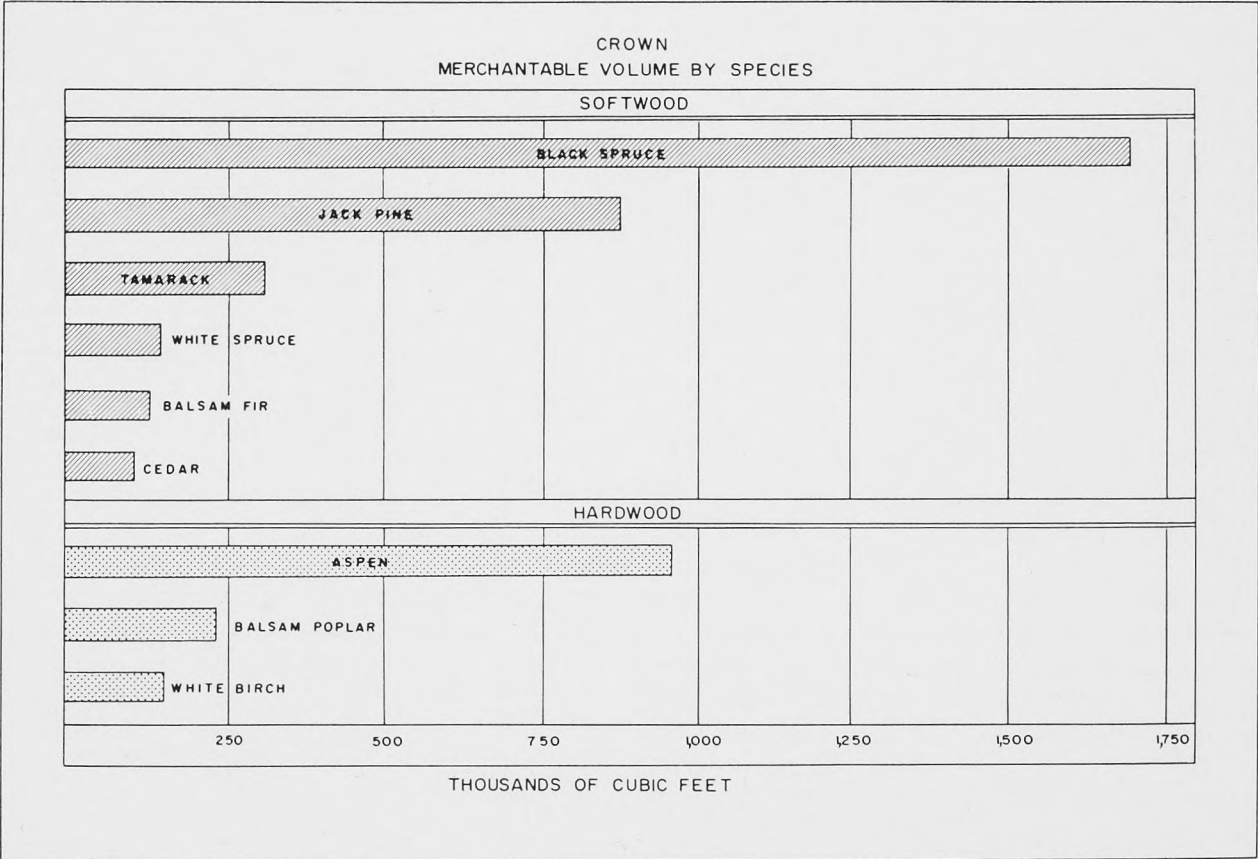


Figure 10.

average volume in cunits per acre by height and density classes for all tree species.

Photo interpretation and forest mapping by townships was completed during the winter of 1952-53. Compilation of the area and volume estimates by types, townships, Working Circles, and for the whole Forest Section were completed during the summer of 1953.

Lithographed maps for the topographic units known as Sprague and Whitemouth Lake were produced in 1955. These maps were printed in four colors or eight shades, on a scale of one inch to one mile.

The final summary of area and volume data for the whole Forest Section is shown in Tables 1 to 7

inclusive, while similar information by Working Circles is contained in Tables 8 to 12.

### Forest Utilization and Working Plans

The Southeastern Forest Section is favorably situated with regard to markets for forest products due to its proximity to Winnipeg, to the pulp and paper mills of Western Ontario and to similar industries in Minnesota and Wisconsin. The water area is small compared with other Forest Sections, and despite the presence of some very large swamps in the central portion, the percentage of productive and potentially productive land is higher than in any other Forest Section except the Mountain Section, amounting to 63.1 per cent of the land area. See Table 1.

**Table 8**  
*Area Classification by Working Circles\*—Southeastern Forest Section*

Working Circle	LAND CLASSES IN ACRES					
	Productive Forest		Potentially Productive	Non-Productive Forest	Permanently Non-Forested Land	Total Land
	Unmerchantable	Merchantable				
CROWN LANDS						
Sprague.....	54,135	142,428	9,938	34,612	66,364	307,477
Piney.....	17,327	104,882	10,305	68,887	54,510	255,911
Woodridge.....	21,676	72,240	18,145	21,133	39,610	172,804
Marchand.....	10,947	54,861	7,019	8,819	2,960	84,606
Dawson.....	22,573	90,377	17,271	10,049	29,284	169,554
Hadashville.....	10,304	71,492	42,080	46,387	15,120	185,383
East Braintree.....	18,225	112,656	11,467	104,258	43,249	289,855
TOTAL.....	155,187	648,936	116,225	294,145	251,097	1,465,590
PATENTED LANDS						
Sprague.....	5,493	15,772	12,342	5,538	9,698	48,843
Piney.....	24,171	18,412	8,863	11,241	23,464	86,151
Woodridge.....	9,935	17,610	21,281	6,767	11,058	66,651
Marchand.....						
Dawson.....	868	2,082	1,006	324	2,047	6,327
Hadashville.....	595	3,606	16,013	299	11,911	32,424
East Braintree.....	751	4,053	4,151	2,842	3,779	15,576
TOTAL.....	41,813	61,535	63,656	27,011	61,957	255,972
ALL LANDS						
Sprague.....	59,628	158,200	22,280	40,150	76,062	356,320
Piney.....	41,498	123,294	19,168	80,128	77,974	342,062
Woodridge.....	31,611	89,850	39,426	27,900	50,668	239,455
Marchand.....	10,947	54,861	7,019	8,819	2,960	84,606
Dawson.....	23,441	92,459	18,277	10,373	31,331	175,881
Hadashville.....	10,899	75,098	58,093	46,686	27,031	217,807
East Braintree.....	18,976	116,709	15,618	107,100	47,028	305,431
TOTAL.....	197,000	710,471	179,881	321,156	313,054	1,721,562

\*In the Southeastern Forest Section each Working Circle or Management Unit corresponds in area with the Ranger District or Administrative Unit of the same name.

Table 9

*Area Classification of Productive Forest by Working Circles, Cover Types and Merchantability—Southeastern Forest Section*

	AREA IN ACRES									
Working Circle	S		M		N		H		Total	
	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch.	Unmerch.	Merch.
CROWN LANDS										
Sprague.....	52,684	75,536	.....	4,993	.....	11,655	1,451	50,244	54,135	142,428
Piney.....	8,965	68,623	1,044	4,236	43	4,008	7,275	28,015	17,327	104,882
Woodridge.....	16,536	52,697	1,134	6,463	.....	991	4,003	12,089	21,676	72,240
Marchand.....	7,769	49,106	443	1,518	2,084	1,683	651	2,554	10,947	54,861
Dawson.....	17,023	68,201	2,561	7,255	.....	.....	2,989	14,921	22,573	90,377
Hadashville.....	8,797	51,714	207	6,300	.....	2,519	1,300	10,959	10,304	71,492
East Braintree.....	17,935	75,475	290	20,292	.....	7,064	.....	9,825	18,225	112,656
SUB-TOTAL.....	129,709	441,352	5,679	51,057	2,127	27,920	17,672	128,607	155,187	648,936
TOTAL.....	571,061		56,736		30,047		146,279		804,123	
PATENTED LANDS										
Sprague.....	2,815	3,631	165	641	.....	685	2,513	10,815	5,493	15,772
Piney.....	2,822	4,944	1,074	791	24	589	20,251	12,088	24,171	18,412
Woodridge.....	3,820	4,584	668	2,227	.....	186	5,447	10,613	9,935	17,610
Marchand.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dawson.....	520	257	100	48	.....	.....	248	1,777	868	2,082
Hadashville.....	55	1,410	199	79	.....	446	341	1,671	595	3,606
East Braintree.....	751	2,998	.....	352	.....	142	.....	561	751	4,053
SUB-TOTAL.....	10,783	17,824	2,206	4,138	24	2,048	28,800	37,525	41,813	61,535
TOTAL.....	28,607		6,344		2,072		66,325		103,348	
ALL LANDS										
Sprague.....	55,499	79,167	165	5,634	.....	12,340	3,964	61,059	59,628	158,200
Piney.....	11,787	73,567	2,118	5,027	67	4,597	27,526	40,103	41,498	123,294
Woodridge.....	20,356	57,281	1,802	8,690	.....	1,177	9,453	22,702	31,611	89,850
Marchand.....	7,769	49,106	443	1,518	2,084	1,683	651	2,554	10,947	54,861
Dawson.....	17,543	68,458	2,661	7,303	.....	.....	3,237	16,698	23,441	92,459
Hadashville.....	8,852	53,124	406	6,379	.....	2,965	1,641	12,630	10,899	75,098
East Braintree.....	18,686	78,473	290	20,644	.....	7,206	.....	10,386	18,976	116,709
SUB-TOTAL.....	140,492	459,176	7,885	55,195	2,151	29,968	46,472	166,132	197,000	710,471
TOTAL.....	599,668		63,080		32,119		212,604		907,471	

Earlier cutting consisted of saw-timber, railway ties, cedar poles and fuelwood. Pulpwood cutting (almost entirely spruce) reached a first peak in 1927. During the depression years jack pine fuelwood was the main product reaching a peak of 70,000 cords in 1935-36. After the second world war the demand for all forest products, except fuelwood, increased greatly, reaching a peak in 1952. This district supplied the main bulk of the jack pine poles used in Manitoba's rural electrification

program, about 375,000 poles being supplied from the district in the period 1946 to 1955, inclusive.

About 70 portable sawmills are operating on timber produced in the district. A number of wood-using industries located in villages adjoining draw their raw material in the form of lumber or bolts from the Forest Section. Greater Winnipeg has a large number of similar industries using local as well as imported wood. Two small pulp and paper mills using poplar and spruce for the manufacture



**Table 10**  
*Softwood and Hardwood Volume by Size Classes and Working  
 Circles—Southeastern Forest Section*

Working Circle	VOLUME IN CUNITS (100 cu. ft. Units)					
	Softwood		Hardwood		Total	
	4" - 9"	10" +	4" - 9"	10" +	4" - 9"	10" +
CROWN LANDS						
Sprague.....	580,328	47,359	287,942	258,745	868,270	306,104
Piney.....	309,190	29,695	95,716	71,959	404,906	101,654
Woodridge.....	189,337	13,514	48,599	36,674	237,936	50,188
Marchand.....	349,612	14,614	18,190	16,906	367,802	31,520
Dawson.....	677,597	39,743	64,188	61,105	741,785	100,848
Hadashville.....	384,727	19,661	71,336	64,381	456,063	84,042
East Braintree.....	549,129	63,392	107,300	116,265	656,429	179,657
TOTAL.....	3,039,920	227,978	693,271	626,035	3,733,191	854,013
PER CENT.....	93.0	7.0	52.5	47.5	81.4	18.6
PATENTED LANDS						
Sprague.....	26,803	1,996	24,724	21,056	51,527	23,052
Piney.....	21,630	2,675	23,955	18,658	45,585	21,333
Woodridge.....	21,453	2,036	30,652	25,201	52,105	27,237
Marchand.....						
Dawson.....	3,119	7	3,476	5,114	6,595	5,121
Hadashville.....	9,785	1,582	5,444	5,862	15,229	7,444
East Braintree.....	18,071	1,197	2,514	2,029	20,585	3,226
TOTAL.....	100,861	9,493	90,765	77,920	191,626	87,413
PER CENT.....	91.4	8.6	53.8	46.2	68.7	31.3
ALL LANDS						
Sprague.....	607,131	49,355	312,666	279,801	919,797	329,156
Piney.....	330,820	32,370	119,671	90,617	450,491	122,987
Woodridge.....	210,790	15,550	79,251	61,875	290,041	77,425
Marchand.....	349,612	14,614	18,190	16,906	367,802	31,520
Dawson.....	680,716	39,750	67,664	66,219	748,380	105,969
Hadashville.....	394,512	21,243	76,780	70,243	471,292	91,486
East Braintree.....	567,200	64,589	109,814	118,294	677,014	182,883
TOTAL.....	3,140,781	237,471	784,036	703,955	3,924,817	941,426
PER CENT.....	93.0	7.0	52.7	47.3	80.7	19.3

of insulating board secure the bulk of their wood from the Southeastern Forest Section. There are still opportunities for new forest industries in manufacturing higher quality products, using wood which is now being exported in the unmanufactured form of pulpwood.

The average annual cut on Crown lands for the seven year period 1949-50 to 1955-56, inclusive, is shown in Table 14.

Starting with the year 1939-40 a figure was set for the annual allowable cut in the Marchand Working Circle. Following a re-cruise of the original Sandilands Forest Reserve a Working Plan was initiated for this area, with separate allowable cuts for the Marchand and the Dawson Working Circles. However, the original Forest Reserve of 189 square miles was only a small part of the Forest Section and it was not until the whole area had been

**Table 11**  
*Softwood and Hardwood Volume by Land Tenure and Working Circles—  
Southeastern Forest Section*

Working Circle	VOLUMES IN 100 CUBIC FOOT UNITS (CUNITS)								
	Crown			Patented			Total		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total	Softwood	Hardwood	Total
Sprague.....	627,687	546,687	1,174,374	28,799	45,780	74,579	656,486	592,467	1,248,953
Piney.....	338,885	167,675	506,560	24,305	42,613	66,918	363,190	210,288	573,478
Woodridge.....	202,851	85,273	288,124	23,489	55,853	79,342	226,340	141,126	367,466
Marchand.....	364,226	35,096	399,322	-----	-----	-----	364,226	35,096	399,322
Dawson.....	717,340	125,293	842,633	3,126	8,590	11,716	720,466	133,883	854,349
Hadashville.....	404,388	135,717	540,105	11,367	11,306	22,673	415,755	147,023	562,778
East Braintree.....	612,521	223,565	836,086	19,268	4,543	23,811	631,789	228,108	859,897
<b>TOTAL.....</b>	<b>3,267,898</b>	<b>1,319,306</b>	<b>4,587,204</b>	<b>110,354</b>	<b>168,685</b>	<b>279,039</b>	<b>3,378,252</b>	<b>1,487,991</b>	<b>4,866,243</b>
<b>PER CENT.....</b>	<b>71.2</b>	<b>28.8</b>	<b>100.0</b>	<b>39.5</b>	<b>60.5</b>	<b>100.0</b>	<b>69.4</b>	<b>30.6</b>	<b>100.0</b>

**Table 12**  
*Softwood and Hardwood Volume per Acre Merchantable Area by Land Tenure, Cover  
Type and Working Circle—Southeastern Forest Section*

Working Circle	VOLUME PER ACRE IN CUBIC FEET								
	Crown			Patented			Total		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total	Softwood	Hardwood	Total
Sprague.....	441	384	825	183	290	473	415	374	789
Piney.....	323	160	483	132	231	363	295	170	465
Woodridge.....	281	118	399	133	317	450	252	157	409
Marchand.....	664	64	728	-----	-----	-----	664	64	728
Dawson.....	794	138	932	150	413	563	779	145	924
Hadashville.....	565	190	755	315	314	629	553	196	749
East Braintree.....	544	198	742	475	112	587	541	196	737
<b>AVERAGE.....</b>	<b>504</b>	<b>203</b>	<b>707</b>	<b>179</b>	<b>274</b>	<b>453</b>	<b>476</b>	<b>209</b>	<b>685</b>

**Table 13**  
*General Stand Volume Table*  
(Data from Final Set of Curves)

Height Class	DENSITY CLASSES							
	in Square Feet of Basal Area per Acre at Breast Height.							
	A 0' - 20'	B 20' - 40'	C 40' - 60'	D 60' - 80'	E 80' - 100'	F 100' - 120'	G 120' - 140'	
	VOLUME IN CUNITS PER ACRE (100 cubic feet)							
4 (30' - 40').....	1.15	3.85	6.60	9.35	12.15	15.00	-----	
5 (40' - 50').....	1.85	5.40	9.09	12.50	16.15	19.75	23.35	
6 (50' - 60').....	2.50	6.90	11.30	15.70	20.10	24.55	29.00	
7 (60' - 70').....	-----	-----	13.60	19.85	24.10	29.35	34.60	
8 (70' - 80').....	-----	-----	-----	-----	-----	34.20	40.25	
9 (80' - 90').....	-----	-----	-----	-----	-----	-----	45.80	

Volumes refer to Gross Round Wood Volume to 3" top and 12" stump.  
Table based on 895 one-fifth acre plots measured in the field.

Table 14

Utilization by Forest Products Average Annual Production from Crown Lands—Southeastern Forest Section

	<i>f.b.m.</i>
Lumber	
Spruce.....	868,134
Balsam fir.....	131,224
Jack pine.....	4,045,930
Tamarack.....	58,952
Cedar.....	6,384
Poplar.....	2,463,430
Birch.....	44,285
Ash.....	1,439
TOTAL LUMBER.....	7,619,778
Railway ties	<i>pieces</i>
Jack pine.....	37,278
Tamarack.....	100
TOTAL RAILWAY TIES.....	37,378
Line Poles	<i>pieces</i>
Jack pine.....	15,772
Cedar.....	23,612
TOTAL LINE POLES.....	39,384
Pulpwood	<i>cords</i>
Spruce.....	40,725
Balsam fir.....	3,145
Jack pine.....	11,084
Poplar.....	1,999
TOTAL PULPWOOD.....	56,953
Boxwood	<i>cords</i>
Jack pine.....	784
Poplar.....	868
TOTAL BOXWOOD.....	1,652
Fuelwood	<i>cords</i>
Jack pine.....	3,603
Spruce.....	135
Tamarack.....	177
Balsam fir.....	15
Cedar.....	4
Poplar.....	2,085
Birch.....	79
TOTAL FUELWOOD.....	6,098
Slabs.....	<i>cords</i> 1,202
Round timber.....	<i>lin. feet</i> 25,452
Christmas trees.....	<i>pieces</i> 22,951

cruised and inventoried (1949-53) that Working Plans could be formulated for the whole area.

The annual permissible depletion by species has been calculated for the whole Forest Section as shown in Table 15.

The annual permissible depletion for the two main species has been calculated for the seven Working Circles as shown in Table 16.

Table 15

Annual Permissible Depletion by Species on Crown Lands—Southeastern Forest Section

Species	Permissible Depletion in Cunits
White spruce.....	2,042
Black spruce.....	24,942
Balsam fir.....	2,489
Jack pine.....	18,973
Tamarack.....	5,207
Cedar.....	942
TOTAL SOFTWOODS.....	54,595
Poplar.....	27,557
White birch.....	2,766
TOTAL HARDWOODS.....	30,323
TOTAL—ALL SPECIES.....	84,918

A comparison between the two figures for permissible depletion by cutting and fire and the actual cut for the five-year period, 1948-49 to 1952-53, showed that the forest was being seriously depleted of both spruce and jack pine more particularly in the Woodridge and Piney Working Circles, but in varying degrees in other districts as well. Steps have been taken to bring the depletion into balance with growth.

A program of survey involving revision of inventory figures and collection of data for management purposes got underway in 1955 with the rephotography of 960 square miles in the western part of the district. This was followed by ground surveys in 1956. Special attention is being given not only to areas with timber but also to bare areas and to

Table 16

Annual Permissible Depletion of Black Spruce and Jack Pine on Crown Lands by Working Circles

Working circle or ranger district	Permissible depletion in cunits		
	Black spruce	Jack pine	Total
East Braintree.....	4,250	1,700	5,950
Hadashville.....	2,550	1,700	4,250
Dawson.....	3,188	4,250	7,438
Marchand.....	1,190	5,100	6,290
Woodridge.....	2,465	1,470	3,935
Piney.....	4,799	3,753	8,552
Sprague.....	6,500	1,000	7,500
TOTAL.....	24,942	18,973	43,915



poorly stocked areas in order to supply information for a reforestation program.

### **Reforestation**

Since the future of our forests depends on regeneration of the cut-over and burned-over areas, the establishment of this new crop is of great concern. Contrary to a widely held popular view, most of the regeneration in the forest must depend on natural seeding from the parent trees. Black spruce in the lowlands areas usually reproduces itself satisfactorily by natural seeding or layering. Jack pine, in sandy areas where the stand is not too dense, and where the surface vegetation is not too competitive, has been found to reproduce itself in a satisfactory manner. Jack pine and black spruce will also reproduce after fire from the seed obtained from cones on the trees which are opened by the heat of the fire. On the other hand, repeated fires will eliminate all tree growth. Aspen poplar reproduces readily from root suckers while balsam poplar and birch re-establish themselves by suckers from the root-collar.

In the Southeastern Forest Section there are many areas where repeated fires or clear cutting on lands formerly homesteaded have eliminated the forest completely. In this case resort must be made to artificial seeding or planting. Experimental seeding has been done in a small way from 1928 onward. Artificial scarification by special machinery is necessary to secure results and even then success depends

mainly on weather conditions following seeding. Reforestation by planting on the other hand has been very successful in this Forest Section.

The first experimental planting was done in 1926 in the Woodridge District. A small tree nursery was maintained at Marchand Ranger Station until 1953, a small seed extraction plant being installed in 1934. Species planted were red pine and Scots pine with minor quantities of jack pine, lodgepole pine and white spruce.

Land was acquired near Hadashville on the Trans-Canada Highway in 1953 as a first step to a much enlarged program of reforestation. The nursery, known as "Pineland," has an area of 165 acres and is intended to serve the Sandilands, Agassiz, Belair and Whiteshell Forest Reserves, and to a lesser extent, the Spruce Woods and Turtle Mountain. A seed extraction plant of modern design has been erected on the nursery site. About one million trees were planted in 1956, and the nursery when fully developed will have an annual production of seven or eight million trees. The Federal Government under the Canada Forestry Act agreement contributed 20 per cent of the initial cost of the new nursery and under the same agreement are making a contribution of \$10.00 per thousand trees planted on unoccupied crown lands.

Up to the end of 1956 the total number of trees planted in the Southeastern Forest Section has amounted to 3,360,000.



*Areas not restocking naturally are planted.*

# Appendix

## SURVEY METHODS

### *Ground Control*

The whole of the Southeastern Forest Section had been subdivided according to the D.L.S. First System of Survey by about 1910, so that control for photographs was available at one mile intervals. Sufficient of the lines could be located on the photographs so that no further control was necessary.

### *Air Photography*

The photographs on which the inventory was based are summer verticals at a scale of 1:15,840 (four inches to one mile) taken in 1946 and 1949.

### *Base Mapping*

Advance information sheets showing the survey grid, topography, and photo centre points were supplied by the Federal Department of Mines and Technical Surveys. This gave accurate control for forest mapping.

### *Field Surveys*

The type classification used in this survey was an adaptation of the system developed by S. T. B. Losee of the Abitibi Power and Paper Company. Types were differentiated by species, composition, height, density, site and sub-type, the following breakdown being employed:

#### (a) *Cover-type*

- S : 75-100% conifers by basal area
- M : 50- 75% conifers by basal area
- N : 25- 50% conifers by basal area
- H : 0- 25% conifers by basal area

#### (b) *Height Class*

- 1 : Average height of main stand 0-10 feet
- 2 : Average height of main stand 10-20 feet
- 3 : Average height of main stand 30-40 feet
- Etc.

#### (c) *Density Class*

- A : 0-20 square feet per acre basal area
- B : 20-40 square feet per acre basal area
- C : 40-60 square feet per acre basal area
- Etc.

#### (d) *Site*

- V<sub>1</sub> : Jack pine ridge top
- V<sub>2</sub> : Black spruce ridge top
- W : Hardwood upper slope
- X<sub>1</sub> : Black spruce lower slope
- X<sub>2</sub> : Mixed lower slope
- Y<sub>1</sub> : Jack pine flat
- Y<sub>2</sub> : Poplar flat
- Z<sub>1</sub> : Wet flat (black spruce)
- Z<sub>2</sub> : Cedar flat

#### (e) *Sub-type*

- 1 : 0- 12% of conifer basal area jack pine
- 2 : 13- 37% of conifer basal area jack pine
- 3 : 38- 62% of conifer basal area jack pine
- 4 : 63- 87% of conifer basal area jack pine
- 5 : 88-100% of conifer basal area jack pine

The above sub-types were used in conjunction with all four cover-type symbols—S, M, N and H, depending on the percentage of jack pine in the coniferous portion of the stand. Additionally, in the S cover-type there might be tamarack sub-types. These were shown by the suffixes L1, L2, L3, L4 and L5, denoting the same percentage of tamarack volume as the first suffixes did for jack pine.

The term type-aggregate has been used as referring to all types in a Forest Section which have common characteristics as to cover-type, height, density, site and sub-type. For example, the symbol "S7EX<sub>1</sub>-1" denotes a type with 75-100 per cent of the basal area in coniferous species, average height 60-70 feet, basal area per acre 80 to 100 square feet, growing on a lower slope site and mainly black spruce, with a jack pine composition less than 12 per cent of the coniferous basal area.

Sampling was distributed as widely as possible over the total inventory area, the twin objectives being to obtain sufficient data for local tree and type-aggregate volume tables, and to familiarize the photo-interpreters with the varying stand conditions to be found in different localities.

Sampling was by means of one-fifth-acre plots (one-quarter chain wide by eight chains long) established at fixed intervals along cruise lines selected by the party chief. In order to obtain a well-distributed sample of all type-aggregates, the

party chiefs were instructed to sample as many type aggregates as possible from each camp site, and not to take too many plots in one particular type in the same general area. Information recorded on each plot included the cover-type, site class, tally by species of all trees over 3.5 inches D.B.H., and four height-age measurements of representative trees. Notes were also made on the topography, soil and young growth, minor vegetation and the general condition of the stand. Sufficient form class measurements were made to determine for each species the relationship between form class, diameter, height and site. Special notes were made on young growth areas.

### ***Forest Maps***

The location of all boundary lines between the various forest types was determined almost entirely from examination of the photographs with the aid of a stereoscope.

After photo interpretation, both forestry and planimetric information was transferred from the photos to the base maps by means of either a Sketchmaster or Seelyscope. The areas of the various forest strata were determined either by dot count or by measurement with a planimeter.

Each finished forestry map covers one township at the 1:15,840 scale. Ozalid prints of the completed maps were prepared for distribution to district personnel and one master copy of each map was hand-colored for filing, using the standard colors recommended by the Federal Forestry Branch.

### ***Interpretation and Compilation***

After field sampling in a given area was completed, the final photo interpretation was made. Since it is on the quality of this work that the accuracy of the inventory largely depends, an effort was made to have the man most familiar with a particular area make the final photo interpretation for that area. Much of the final interpretation was done in the field by the party chiefs and cruisers at a time when stand conditions as they appeared on both the ground and the photos could readily be compared.

The first step in compilation was the transfer of field data to two sets of summary sheets. The height-age and form class data obtained from measurements of sample trees was used to prepare local tree volume tables, while the data on the tally sheets was the basis for the type-aggregate volume tables.

For each Forest Section, separate tree volume tables were prepared for each species, site and height class. The Dominion Form Class Volume Tables were used in conjunction with the height-age and form class data to prepare the local volume tables. The standard system of harmonizing curves was used.

The next step was the preparation of a general stand volume table showing gross volume per acre, all species combined. Field plot data was segregated by height and density classes regardless of site and cover-type. Using the method of least squares and linear regression a series of straight lines was drawn and later harmonized by the Dwight method. Values read from these lines formed a general stand volume table showing average volume in cunits per acre by height and density classes for the whole Forest Section. See Table No. 13.

The next step was the determination of the proportion of each species in each type-aggregate. This was done by a special method of percentages and curves. Similar methods were used to determine the proportion of the two size classes, four to nine inches D.B.H. and ten inches plus. The percentages as arrived at by harmonizing the curves for each height class were applied to the previously calculated general stand volume table, and the results were tabulated as the final type-aggregate volume table.

Up to this point in compilation, stand age was not considered. However, the large number of height-age measurements obtained in the field made it possible to establish by means of a series of curves, the relationship between site, height and age for each of the major species on each site. Age classes could then be assigned to all type-aggregates. Thus, when the final volume summaries were made, they were subdivided by cover-type and age class only; height, site and density being omitted.

Gross volumes of each individual type were first tabulated in cubic feet by numbered types and later compiled in township units by species, cover-type, age class, size class and land tenure.

In order to express the net rather than the gross volume, a cull factor was established for each species in each Forest Section. This factor was based on a general knowledge of the various species, and notes made by the cruisers regarding defects observed on the sample plots. The cull



factor was applied to the growing Circle and not to the smaller units of type and township. See Table 17.

**Table 17**  
*Cull Factor by Species*  
*Southeastern Forest Section*

<i>Species</i>	<i>Cull per cent</i>
White spruce.....	10
Black spruce.....	5
Balsam fir.....	30
Jack pine.....	15
Tamarack.....	10
White cedar.....	40
Aspen.....	40
Balsam poplar.....	40
White birch.....	40

## Reports

Fifty-five inventory summaries were compiled for Working Circles or Ranger Districts, each of these units averaging about 1,000 square miles in area. Each summary contains a breakdown of the area and net volume by cover-types and age classes. Sub-totals are included for the Crown and patented portions of each unit. Net volumes are expressed in both cunits (100 cu. ft. units) and M.F.B.M. for the ten inch plus diameter group, and in cunits alone for the four to nine inch D.B.H. group. These inventory summaries were totalled by Forest Sections, and a report is being published on the forest resources of each Forest Section.

## ROTATION

The length of the rotation for the various species depends on the site, the product to be cut, and, to a lesser extent, the climatic region. Table 18 gives tentative figures for the productive forest area of Manitoba. A range of rotation age is given depending mainly on whether the stand is to be cut for pulpwood or saw timber.

**Table 18**  
*Rotation by Species*

<i>Species</i>	<i>years</i>
White spruce.....	80 - 120
Black spruce.....	80 - 140
Balsam fir.....	60 - 80
Jack pine.....	60 - 90
Tamarack.....	70 - 100
Cedar.....	100 - 200
Aspen poplar.....	50 - 70
Balsam poplar.....	50 - 70
White birch.....	60 - 80

## ALLOWABLE CUT

A determination of the allowable annual depletion by cutting, fire, etc., is necessary in order that the forest may be kept on a sustained yield basis. The compiled inventory data presents volume by cover-type, age class and species while area is presented by age class and cover-type only. The method of calculation most suitable to the available data is by a volumetric formula.

The simplest formula for finding the annual yield, commonly known as the Von Mantel formula, is as follows:

$$\text{Annual Yield} = \frac{\text{Growing Stock}}{\text{Half the number of years in rotation}}$$

For general inventory purposes this formula has been used as the basis for calculation of the allowable cut by Working Circles, each species being calculated separately according to its average rotation age. A deduction of 20 per cent has been made to allow for contingencies such as loss from fire, windfall, insects and disease.

In those areas which have established Working Plans such as the Southeastern Forest Section, the Duck Mountain Forest Reserve, Pulpwood Berth No. 1 and certain portions of the Lowlands South Forest Section, various alternative methods have been used in arriving at the Allowable Cut. It is usual in these cases to secure a more accurate estimate of the Allowable Cut by methods which take into account any unevenness in age class distribution.

## Common and Botanical Names of Tree Species Included in Timber Estimates

### CONIFERS

White Spruce —	<i>Picea glauca</i> (Moench) Voss
Black Spruce —	<i>Picea mariana</i> (Mill) BSP.
Balsam fir —	<i>Abies balsamea</i> (L.) Mill
Jack pine —	<i>Pinus banksiana</i> Lamb.
Tamarack —	<i>Larix laricina</i> (Du Roi) K. Koch
Cedar —	<i>Thuja occidentalis</i> L.

### HARDWOODS

Aspen poplar —	<i>Populus tremuloides</i> Michx
Balsam poplar —	<i>Populus balsamifera</i> L.
White birch —	<i>Betula papyrifera</i> Marsh.

## DATE DUE SLIP

factor was applied to the g  
ing Circle and not to the  
township. See Table 17.

**Table**  
**Cull Factor**  
**Southeastern F**

Species
White spruce.....
Black spruce.....
Balsam fir.....
Jack pine.....
Tamarack.....
White cedar.....
Aspen.....
Balsam poplar.....
White birch.....

### Reports

Fifty-five inventory sum  
Working Circles or Range  
units averaging about 1,0  
Each summary contains a  
and net volume by cover  
Sub-totals are included for  
portions of each unit. Net  
both cunits (100 cu. ft.  
the ten inch plus diameter  
for the four to nine inch D  
tory summaries were tot  
and a report is being pu  
sources of each Forest Sec

F. 255

### ROTATION

The length of the rotation for the various species depends on the site, the product to be cut, and, to a lesser extent, the climatic region. Table 18 gives tentative figures for the productive forest area of Manitoba. A range of rotation age is given depending mainly on whether the stand is to be cut for pulpwood or saw timber.

**Table 18**  
**Rotation by Species**

Species	years
White spruce.....	80 - 120
Black spruce.....	80 - 140
Balsam fir.....	60 - 80
Jack pine.....	60 - 90
Tamarack.....	70 - 100
Cedar.....	100 - 200
Aspen poplar.....	50 - 70
Balsam poplar.....	50 - 70
White birch.....	60 - 80

### ALLOWABLE CUT

of the allowable annual deple-  
, etc., is necessary in order that  
kept on a sustained yield basis.  
Inventory data presents volume by  
s and species while area is pre-  
ass and cover-type only. The  
on most suitable to the available  
etric formula.

ula for finding the annual yield,  
s the Von Mantel formula, is as

### Growing Stock

f the number of years in rotation  
Inventory purposes this formula has  
asis for calculation of the allow-  
ing Circles, each species being  
ly according to its average rota-  
on of 20 per cent has been made  
encies such as loss from fire,  
d disease.

which have established Working  
Southeastern Forest Section, the  
Forest Reserve, Pulpwood Berth  
portions of the Lowlands South  
rious alternative methods have  
ing at the Allowable Cut. It is  
s to secure a more accurate esti-  
ble Cut by methods which take  
unevenness in age class distri-

bution.

### Common and Botanical Names of Tree Species Included in Timber Estimates

#### CONIFERS

White Spruce —	<i>Picea glauca</i> (Moench) Voss
Black Spruce —	<i>Picea mariana</i> (Mill) BSP.
Balsam fir —	<i>Abies balsamea</i> (L.) Mill
Jack pine —	<i>Pinus banksiana</i> Lamb.
Tamarack —	<i>Larix laricina</i> (Du Roi) K. Koch
Cedar —	<i>Thuja occidentalis</i> L.

#### HARDWOODS

Aspen poplar —	<i>Populus tremuloides</i> Michx
Balsam poplar —	<i>Populus balsamifera</i> L.
White birch —	<i>Betula papyrifera</i> Marsh.

SD 146 M3 M27 1956 NO-1  
MANITOBA FORESTRY BRANCH  
FOREST RESOURCES INVENTORY  
1956

39676272 SCI



\*000013776083\*

SD 146 M3 M27 1956 no.1  
Manitoba. Forestry Branch  
Forest resources inventory,  
1956 :

39676272 SCI

MAY 07 1984



**B40062**